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(15) Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11) Publication number:

0 429 803 A1

(12)

## EUROPEAN PATENT APPLICATION

(21) Application number: 90119143.7

(51) Int. Cl.5: B65G 47/68

(22) Date of filing: 05.10.90

(30) Priority: 23.11.89 SE 8903937

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(43) Date of publication of application:  
05.06.91 Bulletin 91/23

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(84) Designated Contracting States:  
AT BE CH DE DK ES FR GB GR IT LI LU NL SE  
Bulletin 1

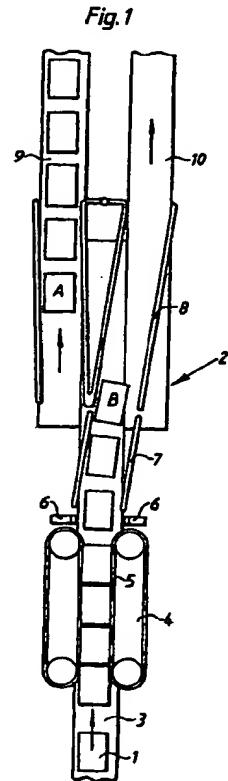
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### (54) A method and an apparatus for marshalling objects.

(57) The invention relates to a method and an apparatus for marshalling objects (1) from one ingoing conveyor (3) to two outgoing conveyors (9, 10).

Counting gaps are created by a belt brake (4) at slower speed than the ingoing conveyor (3). The counting gaps are registered by a pair of photocells (6), and two gates (7, 8) are manoeuvred by the intermediary of a control unit.

The gate (7) above the ingoing conveyor (3) is of the single type, and the gate (8) above both of the outgoing conveyors is of the double type. The gates are mechanically interconnected and move towards one another, marshalling in the objects (1) onto one or the other of the outgoing conveyors (9, 10).



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## A METHOD AND AN APPARATUS FOR MARSHALLING OBJECTS

### TECHNICAL FIELD

The present invention relates to a method of marshalling objects which are advanced on one ingoing conveyor onto two outgoing conveyors, and an apparatus for carrying the method into effect.

### BACKGROUND ART

Use is often made within the manufacturing industry of conveyors for moving objects from, for example, the production unit to packing or distribution. Not least in the packing of foods such as, for example, milk or juice in disposable cartons, the ready-filled cartons are conveyed from the filling machine to some form of distribution unit in order that the cartons may more readily be handled in the distribution stage to the consumer.

Most generally, a single conveyor departs from the filling machine. It is occasionally desirable to marshal the cartons on this single conveyor onto two different conveyors. By such means, it will be possible to cause a certain proportion of production to be distributed in one way and the remaining proportion of production in another way. Objects on two conveyors may also be led into one and the same distribution unit with a view to increasing output capacity.

However, problems have previously been experienced in this art in exactly marshalling cartons or other objects in a given distribution ratio. Furthermore, prior art distributor devices have not proved capable of marshalling objects on their way into or out of the distributor, but instead the distributor has had to be run until completely empty, which, in turn entails that output capacity will be very low indeed.

### SUMMARY OF THE INVENTION

One object of the present invention is to devise a method for marshalling objects, for example cartons or packages, in accordance with an exact number, from one ingoing conveyor onto two outgoing conveyors, while retaining output capacity.

This and other objects are attained according to the present invention in that a method of the type described by way of introduction is characterised in that the objects, with a view to creating counting gaps, are spread out by means of a belt brake at slower speed than the above-mentioned ingoing conveyor, where after the objects are marshalled onto the two outgoing conveyors in that two cooperating gates guide the objects to the one or the other outgoing conveyor.

A further object of the present invention is to devise an apparatus for marshalling objects, the output capacity of the apparatus not being impaired by the necessity of emptying the distributor unit on each marshalling switch, but exact distribution may take place simultaneously as the objects move through the distributor.

These and other objects are attained according to the present invention in that an apparatus of the type described by way of introduction is characterised by a movable gate secured on the ingoing conveyor and cooperating with a movable gate secured on the outgoing conveyors, and photocells provided for registration of a number of objects.

### BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

The nature of the present invention and its aspects will be more readily understood from the following brief description of the accompanying Drawings, and discussion relating thereto.

In the accompanying Drawings:

- Fig. 1 is a simplified plan view of a distributor with its ingoing and outgoing conveyors;
- Fig. 2 illustrates the marshalling gates; and
- Fig. 3 illustrates the ingoing conveyor which continues as one of the outgoing conveyors.

The Drawings show only those details which are essential for an understanding of the present invention.

### DESCRIPTION OF PREFERRED EMBODIMENT

As is illustrated in Fig. 1, cartons 1 advance in towards a distributor 2 on a conveyor 3 with an endless conveyor surface. Immediately ahead of the distributor 2, there is disposed a belt brake 4 of conventional type in which belts 5 protrude in towards the cartons 1 on either side thereof and retard the movement of the cartons 1 at the same time as these slip on the conveyor surface. The belt brake 4 makes it possible to release the cartons 1 with uniform spacing or gaps.

These gaps between the cartons 1 are registered by, for example, a pair of photocells 6 disposed downstream of the belt brake 4 seen in the direction of movement of the cartons 1. The registrations are transmitted to a master control system and, after a certain number of gaps, i.e. after a certain number of cartons 1 has departed from the belt brake 4, the master control system emits a signal to the belt brake 4 which restrains the subsequent carton 1 so that a longer gap, or marshalling gap, occurs. The length of this gap varies in

response to the size of the objects and the speed of the conveyors. With a certain time-lag, so that the marshalling gap will be located in register with the joint between the two gates in the distributor 2, the master control system emits a switch signal.

The two gates, a single gate 7 above the ingoing conveyor 3 and a double gate 8 above both of the outgoing conveyors 9 and 10, are mechanically interconnected with parallel arms 11 which are illustrated in Fig. 2. These are suitably manoeuvred by a pneumatic piston and cylinder assembly. Hence, the gates 7 and 8 move towards one another so that a path is opened either from the ingoing conveyor 3 to the left-hand outgoing conveyor 9, or from the ingoing conveyor to the right-hand outgoing conveyor 10. Two gates 7 and 8 which move towards one another each have a shorter distance to travel than if only one gate had been employed, which results in a more rapid distributor. Each gate 7, 8 changes its angular position by only 50% of what would have been necessary using one single gate.

When the marshalling gap is now located between the single gate 7 and the double gate 8, the gates 7 and 8 begin to move towards one another. At this point, the distributor 2 is filled with cartons 1 which, thus, accompany the gates 7 and 8 in their movements without being obstructed in their advancement. Fig. 1 shows how a switch has just taken place between cartons A and B. When a preselected number of cartons 1 after carton B has departed from the belt brake 4, a marshalling gap is once again created and a signal is emitted with time-lag to the gates 7 and 8, whereafter switching once again takes place.

Fig. 2 illustrates the gates 7 and 8 and the superjacent parallel arms 11 which make for a coordinated movement of the gates 7 and 8 towards one another. The parallel arms 11 are connected to the gates 7 and 8 by means of vertical struts 12. The gates 7 and 8 may also be interconnected such that some form of parallel arm linkage is disposed beneath the conveyors.

Fig. 3 shows how the ingoing conveyor 3 may be caused to continue as one of the outgoing conveyors 10, this saving one drive station. The other outgoing conveyor 9 is wholly separate from this arrangement, with its own drive station. The ingoing conveyor 3 turns and runs obliquely backwards on a rail 13, turning upwards again as an outgoing conveyor 10. This outgoing conveyor 10 having reached its final destination, it once again turns and runs. On its way, it changes level so that it can pass beneath the distributor 2 and runs, on a rail 14, obliquely under the distributor 2 and back, whence the ingoing conveyor 3 starts. On its return it changes level and turns upwards at the starting point.

As will be apparent from the above description, the present invention realises a method and an apparatus for marshalling objects from one conveyor onto two conveyors, with a maintained high output capacity since the switching between the different conveyors can take place while objects are still in the distributor. Distributors according to the present invention also make possible the distribution of an exact number onto each conveyor, which may be necessary when a certain proportion of production is intended to be conveyed to one distribution unit and the remaining proportion of production to another distribution unit.

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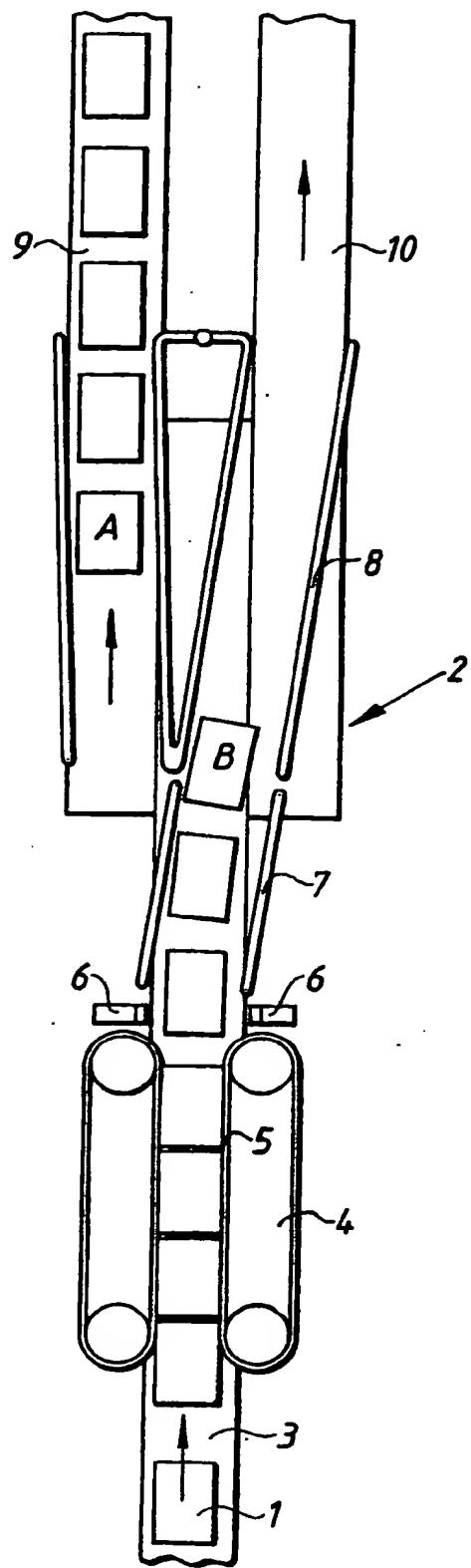
### Claims

1. A method of marshalling objects (1) which are advanced on one ingoing conveyor (3) onto two outgoing conveyors (9, 10), characterised in that the objects (1) are, for purposes of creating counting gaps, spread-out by means of a belt brake (4) at slower speed than said ingoing conveyor (3), whereafter the objects (1) are marshalled onto the two outgoing conveyors (9, 10) in that two cooperating gates guide the objects (1) to the one (9) or the other (10) outgoing conveyor.
2. The method as claimed in Claim 1, characterised in that the belt brake (4) operates at approximately 20% slower speed than the ingoing conveyor (3).
3. The method as claimed in Claim 1, characterised in that photocells (6) register the counting gaps between the objects (1).
4. An apparatus for marshalling objects (1), including one ingoing conveyor (3) and two outgoing conveyors (9, 10), characterised in that a movable gate (7) is secured on the ingoing conveyor (3), and cooperates with a movable gate (8) secured on the outgoing conveyors (9, 10), photocells (6) being provided for registration of the number of objects (1).
5. The apparatus as claimed in Claim 4, characterised in that the gate (7) above the ingoing conveyor (3) is single and the gate (8) above the outgoing conveyors (9, 10) is double.
6. The apparatus as claimed in Claim 4, characterised in that the ingoing conveyor into the distributor continues as one of the outgoing conveyors.

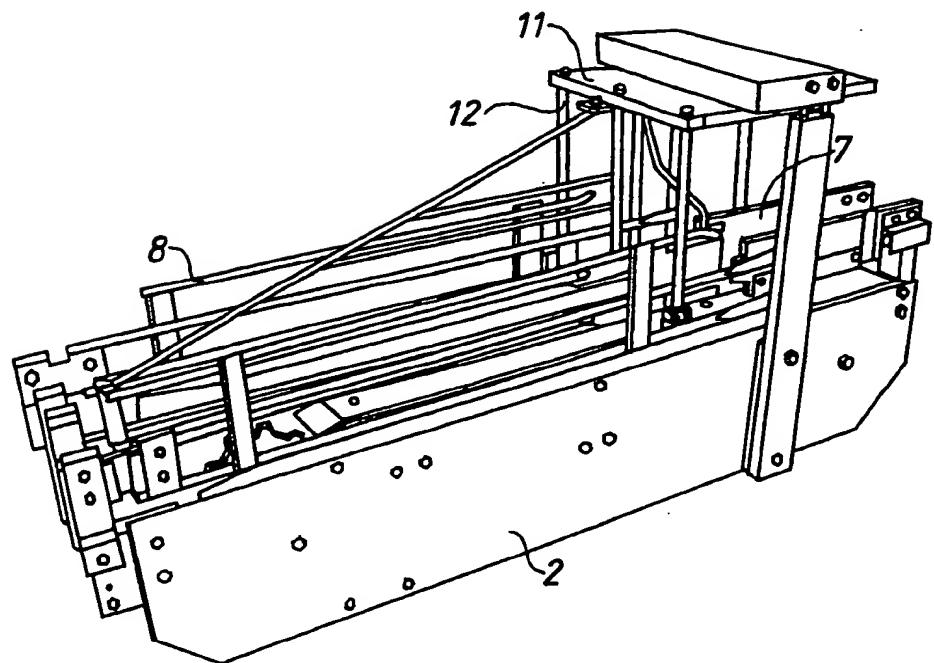
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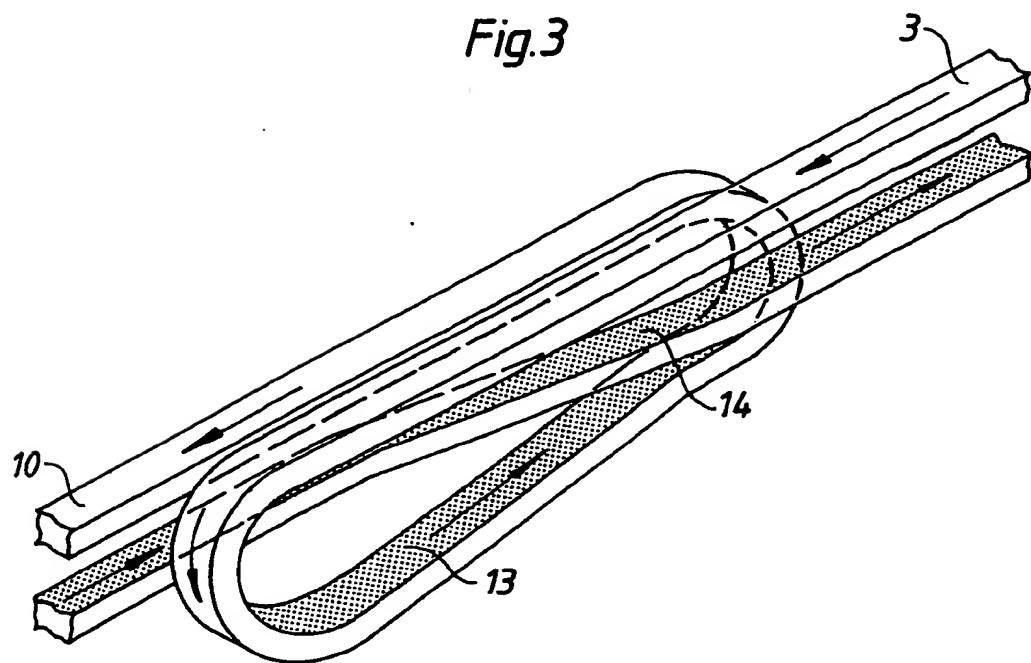
Fig. 1



*Fig.2*



*Fig.3*





European Patent  
Office

## EUROPEAN SEARCH REPORT

Application number  
**EP90119143.7**

<b>DOCUMENTS CONSIDERED TO BE RELEVANT</b>			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.)
Y	GB,A, 2 053 824 (HUNTING ELECTROCONTROLS LIMITED) 11 February 1981 *See page 2, line 80, page 2 line 83 - line 96*	1	B 65 G 47/68
Y	US,A, 4 060 165 (BAUER) 29 November 1977 *See figure 2 column 4, line 51 - line 63*	1	
X	*See figure 2*	4,5	
X	US,A, 4 003 465 (BAUER) 18 January 1977 *See figure 2*	4,5	
A	Abstracts of Japan. Vol. 9, Nr 279 (M-427), abstract of JP-A-60-122623 MIYAKE SEISAKUSHO K.K.) 1 July 1985	1	
<b>TECHNICAL FIELDS SEARCHED (Int. Cl.)</b>  <b>B 65 G</b>			
The present search report has been drawn up for all claims.			
Place of search	Date of completion of the search	Examiner	
STOCKHOLM	30.11.1990	B. LINDKVIST	
<b>CATEGORY OF CITED DOCUMENTS</b>			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	